Impact of Front Line Demonstration on Adoption of Seed Treatment in Soybean

M. K. Rathod[1], G. R. Tidke[2] and R. P. Mandve[3]

1 & 2. Asso. Prof. 3. Asstt. Prof. Deptt. of Extension Education , College of Agriculture, Nagpur (M.S.)

Corresponding author e-mail : milindrathod73@gmail.com

ABSTRACT

The study was conducted in Wardha district of Maharashtra State where front line demonstrations on seed treatment in soybean were conducted by KVK on farmers field. Total fifty FLDs were evaluated to access their impact on adoption and relative advantage, compatibility, complexity and observability. It was found that seed treatment in soybean gives 56.93 per cent more yield as compare to untreated seed. Almost all the respondents expressed that seed treatment requires no labour and majority said that initial cost was also very low. In the compatibility issues cent per cent farmers reported that this technology is suitable to agro-climatic conditions, consistent with existing situation and compatible with norms of culture. Over 90.00 per cent respondents accepted that it meets felt need of farmers. All farmers stated that seed treatment is easy to understand and perform. Effect of technology was found visible to 100.00 per cent farmers. In the categorization, majority of respondents were found to be taken high relative advantage, highly compatible, low complexity and high observability. In total, technology effectiveness calculated was 91.96. Regarding impact on adoption, most of the respondents (68.00%) were accepted the technology but not able to adopt due to some constraints. Farmers have given feedback that with the low cost inputs, technology was very effective to increase the yield of soybean (100.00%), bio-products are not readily available in local area (100.00%), darken the hands and cloths and burning the eyes are the complaints of farmers using bio-treatment of the seed. In the relational analysis, relative advantage and observability were positive and highly significant with the adoption of seed treatment whereas, complexity was highly but negatively correlated with the adoption.

***Key words** : Impact; Adoption; Advantage; FLD; Agro-climatic conditions;*

Initially the main emphasis of KVK is given on vocational trainings to the farmers and rural youths. It was very successful attempt made through the KVK, later on demand increases for additional functions to be operated through KVK. Likewise, activities of KVK tailored as per demand and Front Line Demonstrations and On-Farm Testing are being conducted by KVK. Front Line Demonstrations (FLDs) are playing important role to popular the improved technologies by demonstrating on farmers' field in their farming situation. Because FLD involves important principle of 'seeing is believing' also it is the combination of method demonstration and result demonstration. The FLDs conducted on farmers' field are closely monitor by the KVK scientists and arranged different extension activities like field day and kisan goshti to visualise the results over conventional method. Soybean is the major cash crop in Wardha district, hence KVK, Wardha has conducted various front line demonstrations on soybean. Component of seed treatment in soybean was demonstrated from last three years to increase the productivity of soybean. Those FLDs needs to be evaluated, hence the project was planned to study the impact of Front Line Demonstration on adoption of seed treatment in soybean by the farmers with the specific objectives given below.

1. To study the personal, socio-economic and psychological characteristics of farmers for technology effectiveness of technology demonstrated through FLD.
2. To study the adoption and rejection of technology demonstrated through FLD by the farmers.
3. To study the relationship between personal, socio-economic and psychological characteristics and adoption and rejection of technology by the farmers.

METHODOLOGY

Present study was conducted in villages of Wardha District where Front Line Demonstration on seed treatment in soybean was conducted by Krishi Vigyan Kendra, Selsura, District Wardha. Exploratory research design was used for the study. In total 100 FLDs were conducted in three years. Out of it 50 respondents were selected by simple random sampling method from the list of farmers conducted Front Line Demonstration on seed treatment in Soybean given by Krishi Vigyan Kendra, Wardha.

Personal variables selected for the study were measured with the standard scales. Innovativeness was measured with the help of scale developed by *Singh, 1972*. Whereas, scientific orientation, economic motivation and risk preference were measured with the help of scale developed by *Supe, 1969*.

Technology Effectiveness is the intervening variable which refers to the performance of technology in terms of innovation attributes. The major attributes selected for the study were relative advantage, compatibility, complexity and observability which were measured by developing the schedule and index for each attributes was calculated. Techno-effectiveness was calculated with the help of following formula.

$$\text{Technology Effectiveness} = \frac{Index}{4}$$

Index = Relative Advantage + Compatibility + Complexity + Observability

Impact was the dependent variable, impact of seed treatment in soybean demonstrated on farmers field under Front Line Demonstration was measured in terms of Adoption or Rejection of technology by the farmers. Hence it was measured with the simple statements given below. Followed continuously as it was demonstrated (Adopted)

i. Followed some part only (Partial Adoption)
ii. Followed with some modification (Reinvention)
iii. Not followed (Rejected)
iv. Very much like to use but not followed due to constraints (Accepted/Adoptable)

RESULTS AND DISCUSSION

Personal, socio-economic and psychological profile of farmers : The personal, socio-economic and psychological profile of farmers who have conducted the Front Line Demonstration on seed treatment in soybean given by KVK, Wardha are presented in Table 1.

Table 1. Personal, Socio-economic and psychological profile of farmers (N=50)

Characteristic	Level	No.	%
Age	Young (Upto 35)	10	20.00
	Middle (36 - 50)	35	70.00
	Old (Above 50)	05	10.00
Education	Illiterate	01	02.00
	Primary School	03	06.00
	Middle School	21	42.00
	High School	15	30.00
	College & Above	10	20.00
Land Holding	Small	15	30.00
	Medium	10	20.00
	Large	25	50.00
Farm Experience	Low (Up to 10 years)	10	20.00
	Medium (11-20 years)	20	40.00
	High (Above 20 years)	20	40.00
Farm Income	Low	05	10.00
	Medium	20	40.00
	High	25	50.00
Innovativeness	Innovators	00	00.00
	Early Adopters	30	60.00
	Early Majority	10	20.00
	Late Majority	10	20.00
	Laggards	00	00.00
Scientific Orientation	Low	12	24.00
	Medium	18	36.00
	High	20	40.00
Economic Motivation	Low	15	30.00
	Medium	20	40.00
	High	15	30.00
Risk Preference	Low	05	10.00
	Medium	10	20.00
	High	35	70.00

From Table 1 it is observed that majority of respondents (70.00%) belonged to 36 to 50 years age group followed by 20.00 per cent respondents in up to the age of 35 years. It means majority of respondents were belonged to middle to young age group. In the educational category only 2.00 per cent were illiterate and remaining 98.00 per cent were literate. In the literate group, majority of respondents (42.00%) were having middle school education followed by 30.00 per cent in high school and 20.00 per cent were having college and above education. Among the respondents 50.00 per cent were having large land holding while remaining were small (30.00%) and medium (20.00%) farmers. From the selected farmers for the study, 40.00 per cent were

found in both medium and high farm experience i.e. 11-20 years and above 20 years of farm experience, respectively.

Innovativeness referred to an individual is a relatively earlier in adopting improved technology than other members of his social system. In this study it was observed that, 60.00 per cent respondents were early adopters the category next to innovators. 20.00 per cent were found in early majority and late majority each. No one was found innovators and laggards. Majority i.e. 40.00 per cent respondent were found to be oriented towards use of seed treatment in soybean followed by 36.00 and 24.00 per cent in medium and low level of scientific orientation, respectively. In the category of economic motivation majority of respondents were found in medium category (40.00%) followed by low and high category (30.00% each). In case of risk preference 70.00 per cent of respondents have found in the category of high risk preference. This indicates that majority of farmers studied were oriented towards risk and uncertainty and have courage to face the problems seed treatment in soybean.

Intervening Variables :

Technology Effectiveness : In technology effectiveness, dimensions of innovation attributes are the important measures which are given in Table 2.

In the present study dimensions of innovation attributes of the farmers were studied regarding seed treatment in soybean, the findings are given in Table 2. Relative advantage is the first important variable which decides that the technology is perceived as being better than the idea it supersedes. In the FLD, Rhyzobium @ 25gm/kg, PSB @ 25gm/kg and Trichoderma @ 4gm/kg inputs were given to the farmers for seed treatment. It was excited to see the results in farmers' situation. The results in Table 2 shows that seed treatment in soybean in farmers situation gives yield 21.5 q/ha. as compare to 13.7 q/ha. of untreated seed. It means yield dimension shows 56.93 per cent increase over untreated seed yield. These results are in line with the findings of *Tiwari et.ai. (2003), Gurumukhi and Mishra (2003), Sawardekar et.al. (2003), Hiremath and Nagraju (2009) and Dhaka et.al. (2010)*. In case of other dimensions of relative advantages, cent per cent respondents expressed that the technology of seed treatment did not required much additional labour. In Wardha district there was water crisis in the year 2008-09 and 09-10 due to very low rainfall and continue and more than average rain fall in the year 2010-11. In both extreme situations i.e. low rainfall and high rainfall situations all the respondents experienced that treated soybean crop gives better performance. Majority of respondents (90.00%) were found that seed treatment requires very low initial cost or treatment cost. Risk factor is also important dimension of relative advantage, 78.00 per cent respondents were found lower perceived risk in seed treatment. But, degree of discomfort was more as recorded by 72.00 per cent respondents. Irritation due to darken the hands and cloths, powder dusting in the eyes during sowing, creates burning of hands and eyes hence discomfort was recorded by the farmers.

Table 2 . Dimensions of innovation attributes (N=50)

Dimensions	No.	%
Average Yield (q/ha.)	21.5	13.7
Not Labour Expensive	50	100.00
Stands in crisis situation	50	100.00
Low Initial Cost	45	90.00
Lower Perceived Risk	39	78.00
More Degree of Discomfort	36	72.00
Suitable to Agro-climatic conditions	50	100.00
Meet felt need of farmers	46	92.00
Consistent with existing situation/practice	50	100.00
Accept package of practice	47	94.00
Compatible with the norms of culture	50	100.00
Easy to understand	50	100.00
Easy to perform/use	50	100.00
Complex, but provide relative advantage hence ready to follow	30	60.00
Fair results are easily visible	50	100.00

In compatibility issues, cent per cent farmers said that the technology of seed treatment in soybean was suitable to agro-climatic situation, consistent with existing situation and compatible with the norms of culture. 92.00 and 94.00 per cent respondents were feeling that the technology meets the felt need of farmers and use of package of practice i.e. Rhyzobium, PSB and Trichoderma together is beneficial, respectively. In the attribute of complexity all the respondents expressed that the seed treatment in soybean is easy to understand and easy to perform, but 60.00 per cent respondents recorded complexity because of irritation due to dry media (powder) of bio-products. Even though, they are ready to follow the practice as it provides relative advantage. During the growing period of soybean all the respondents observed the better performance of treated seed. They have reported clear visibility of

Table 3. Distribution of respondents according to level of innovation attributes (N=50)

Variable	Level	No.	%
Relative Advantage	Low	11	22.00
	Medium	13	26.00
	High	26	52.00
Compatibility	Low	00	0.00
	Medium	15	30.00
	High	35	70.00
Complexity	Low	31	62.00
	Medium	19	38.00
	High	00	0.00
Observability	Low	00	0.00
	Medium	00	0.00
	High	50	100.00

Table 4. Index value of innovation attributes (N=50)

Variables	Index
Relative Advantage	87.19
Compatibility	94.00
Complexity	13.33
Observabilty	100.00

$$\text{Techno Effectiveness} = \frac{87.19 + 94.00 + 86.67 + 100.00}{4} = 91.96$$

(*Complexity index is 13.33, it means 86.67 per cent technology was not complex, hence in the calculations of Techno Effectiveness, index of not complex was considered.*)

Table 5. Distribution of respondents according to their adoption or rejection of seed treatment technology (N=50)

Variable	Dimensions	No.	%
Impact	Adoption	06	12.00
	Partial Adoption	10	20.00
	Reinvention	00	00
	Rejection	00	00
	Accepted	34	68.00

healthy growth of plant, more numbers of root nodules, more number of pods and better grain filling, no curling of pods in the treated soybean field as seen in untreated seed plot.

From Table 3 it is observed that 52.00 per cent respondents were in the category of high relative advantage of seed treatment in soybean followed by 26.00 per cent in medium level and 22.00 per cent in low level of relative advantage. This clearly indicates that there was relative advantage in use of seed treatment in soybean. Majority of farmers studied (70.00%) found the technology was highly compatible. As revealed from Table 2 due to the irritation, labour were not ready to perform the practice, but the technology provides relative advantage, hence 62.00 per cent respondents reported low complexity of technology followed by remaining 38.00 per cent respondents (Table 3). All the respondents observed the visibility of the technology; hence high observability was recorded by the 100.00 per cent farmers.

Index value of innovation attributes was calculated and presented in Table 4. From Table 4 relative advantages of seed treatment in soybean is 87.19 per cent perceived as better than the untreated soybean. The technology is found to be 94.00 per cent compatible, but 86.67 per cent compatibility was also found. The fair results of technology demonstrated on farmers field was 100.00 per cent visible. In all the technology effectiveness was found to be 91.96 per cent.

Impact : Impact was assessed with the help of adoption or rejection of technology by the farmers. The findings are given in Table 5.

From Table 5 it is observed that only 12.00 per cent respondents have adopted the technology of seed treatment in soybean. In such cases combine effect of bio-fertilizer and bio-fungicide expected in the technology was not gained by the farmers. It is observed that no one has made reinvention in the technology. It is encouraging that no one has rejected the technology; almost all the farmers have accepted the technology. Very few have adopted the technology, some have partially adopted and others (68.00%) have accepted but not adopted the technology due to some situational constraints.

In the Table 6 respondents have given their opinion about technology and constraints in adoption of technology. All the respondents expressed that the technology of seed treatment is very effective to increase the yield of soybean on account of very low input cost. But, on the other side all of them reported that bio-fertilizer and bio-fungicide are not readily and locally available, hence it is difficult to use the technology. 86.00 per cent farmers stated that due to the practice of seed treatment hands and cloths became darken and labours were doing complaints of burning hands due to rubbing of bio products. To make the practice easier, most of the farmers are not using jaggery water as an adhesive agent; hence in dry conditions the powder media became dusted in eyes makes burning of eyes, this creates irritation to the labours. This has developed the

Table 6. Feedback of farmers regarding the technology (N=50)

Feedback	No.	%
Technology is very effective and helps to increase yield on account of very low input cost.	50	100.00
Bio-fertilizers and bio-fungicides are not readily and locally available, hence difficult to use the technology	50	100.00
If bio-products are provided in liquid media, wide adoption of seed treatment is possible.	49	98.00
Darken the hands and cloths and burning of eyes due to dusting of dry powder, hence labours became irritate to handle the treated seed.	43	86.00
Doubtful about the quality of bio products available in the schemes.	18	36.00
Hand glows shall made available for doing seed treatment to avoid burning effect and darken the hands	11	22.00

Table 7. Relationship between personal, socio-economic and psychological characteristics of farmers and their innovation attributes.

Independent Variables	Intervening Variables (Innovation Attributes)			
	Relative Advantage	Compatibility	Complexity	Observability
Age	-0.393**	0.5058**	0.7212**	0.0136
Education	0.6895**	-0.1784	-0.5613**	0.5028**
Farm Size	0.7502**	0.1575	-0.4257**	0.0415
Farm Experience	-0.5218**	0.3549**	0.7802**	-0.0122
Farm Income	0.7280**	0.1322	-0.5617**	0.3867**
Innovativeness	0.5989**	0.8101**	0.0918	-0.0429
Scientific Orientation	0.6381**	0.6325**	-0.1213	0.0162
Economic Motivation	0.1549	-0.1992	-0.1863	0.0218
Risk Preference	0.4022**	0.3207*	-0.1909	0.0656

* Significant at 0.05 level of probability ** Significant at 0.01 level of probability

pessimistic attitude of labours/workers towards the use of seed treatment. Therefore, 98.00 per cent farmers are strongly suggested that the bio products should be available in liquid form. To avoid the problem of darken hands 11.00 per cent farmers have suggested to make hand glows available for seed treatment. Some farmers (18.00%) enthusiastically making efforts to get bio products available in the schemes, but they are doubtful about the quality of bio products as they didn't get expected results from it. Hence, farmers needed availability of quality bio products in the district.

Relational Analysis: From Table 7 it is revealed that Age (r=-0.393) and farm experience (r=-0.5218) of farmers are highly significant (at 0.01 level of probability) but negatively correlated with relative advantage. It indicates that aged farmers having more farm experience got lower relative advantage from the technology. In case of other variables like education farm size, farm income, innovativeness, scientific orientation and risk preference were found positive and highly significant relationship with relative advantage.

Compatibility of technology is found highly significant with age, farm experience, innovativeness, scientific orientation and risk preference is significant at 0.05 level of probability. It means technology was recognized as compatible with increase in the level of those variables. It is assumed that aged and experienced farmers are more oriented towards traditional practices. They are very critical in using the improved technology on their farms. Hence, age (r=0.7212) and farm experience (r=0.7802) are found highly correlated with the complexity. It indicates that aged farmers with more farm experience were interested to search the complexity in the technology of seed treatment. While, farmers having more educational status, having large farm size and more farm income didn't find any complexity in the technology. It is observed from Table 7 that education (r= 0.5028) and farm income (r=0.3867) are positively and highly correlated with the visibility. Educated farmers having high income were clearly pointed out the fair results of the technology.

It is revealed from Table 8 that relationship between relative advantage (r=0.6775) and observability (r=0.4285) with the adoption of seed treatment in

Table 8. Relationship between innovations attributes of farmers and adoption of seed treatment technology

Independent Variables	Adoption
Relative Advantage	0.6775**
Compatibility	0.0476
Complexity	-0.8017**
Observability	0.4285**

** Significant at 0.01 level of probability

soybean at 0.01 level of significance. Whereas, complexity is also highly significant but negatively correlated with the adoption of seed treatment in soybean. It clearly indicates that increase in relative advantage and observability of the technology, adoption of seed treatment in soybean became increases. Lesser the complexity more is the adoption as complexity (r = -0.8017) is negative and highly correlated with the adoption. Compatibility is expected to significantly correlate with the adoption, but here in the study, compatibility was found non significantly related with the adoption of technology. This is plausibly because in the seed treatment there is not any hard compatibility issues involved.

CONCLUSION

In the present study techno effectiveness was found to be very high, technology was accepted by most of the farmers, but very low adoption was recorded due to non availability, poor quality and physical properties of bio-fertilizers. Hence, it can be concluded that quality bio-fertilizers and bio-fungicides can be produce by the KVKs that can be timely available to the farmers at district level, those bio products shall be produce in liquid media to avoid pessimism towards use of bio products in powder form.

Paper received on : November 21, 2012
Accepted on : February11, 2013

REFERENCES

Dhaka, B.L.; B.S. Meena and R.L. Suwalkar (2010). Popularization of improved maize production technology through front line demonstrations in south-eastern. *Rajasthan. J. Agri. Sci.* **1** (1): 39-42.

Gurumukhi, D. R. and Mishra, S. (2003). Sorghum front line demonstration- A success story. *Agriculture Extension Review.* **15** (4) : 22-23.

Hiremath, S. M. and M. V., Nagraju (2009). Evaluation of front line demonstration trails on onion in Haveri district of Karnataka. *Karnataka J. Agric. Sci,*. **22** (5) : 1092-1093.

Sawardekar, S. V.; Dhane, S.S. and Jadhav, B.B. (2003). Front line demonstration performance of salt-tolerant rice varieties in coastal saline soils. *IRRN*. **28** (1) : 73-74.

Tiwari, R.B.; Singh, Vinay and Chavan, D.P.S. (2003). Impact of front line demonstration of soybean in transfer of improved technology. *Mah. J.of Ext. Edu.*, **22** (1) : 139.

• • • • •